REMARKS

Applicant thanks the examiner for her attention to the application. Applicant has considered the cited references and examiner's comments and objections and has amended the claims to be patentably distinguishable and allowable thereover.

In regard to the examiners objection to the specification lacking antecedence to support the claimed subject matter regarding the positioning of the third passageway, it should be noted that the third passageway at all time has been claimed as terminating at the second cavity. As depicted at Figures 3-6, the second cavity 42 is positioned forward or upstream of the first cavity 26 and the third passageway 40, 411 terminates at the second cavity 42. Although it is believed the examiner is mistaken in her interpretation, the claims have been amended to preclude any continuing misunderstanding.

Claims 24, 26, 27, 30, 32 and 43-48 stand rejected as being obvious under 35 USC §103 over Wilson (5,156,139) in view of Leach (2,976,918) and Briggs (5,879,149).

Wilson is cited for showing an oil burner having electric heater passageway 14, air passageway 16, oil conveying passageway 22, and an oil and air atomizing nozzle 8. It is acknowledged that Wilson does not explicitly show an igniter or step of igniting, the claimed nozzle configuration, or a source of heated liquid or providing such a liquid to the electric heater passageway 14.

Wilson's oil passage 22 is defined by input segment 22A, several broken, discontinuous channel segments 23 and an output segment 22B. A flow path is established only upon fitting plugs 30 to the manifold block as noted at Figure 2. As regards the presence of cavities in Wilson's oil passage 22, the examiner relies on Figure 1 and asserts the output channel portion 22B constitutes a first cavity and the enlarged, unnumbered cavity that receives the nozzle 8 constitutes a second cavity.

Wilson's air channel 16 otherwise exhibits a continuous cross section without any narrowed region. Wilson's air channel 16 intersects the narrowed, aft cavity 22B and not the longer upstream unnumbered larger cavity. **Wilson therefore does not provide any teaching to Applicant's narrowed air passages 41 or the coupling of the narrowed passages 41 to applicant's claimed upstream, second cavity 42 and both of which features are provided for at the amended claims.**

In regard to Wilson's electric heater passageway 14, the passage 14 is shown to be straight and without any convolutions and provides a single open end that receives a heater element and the opposite end of the passage 14 is closed. As obvious to anyone skilled in the art, the disclosed passage 14 will not support liquid through flow. No suggestion or motivation exists within the "four corners" of Wilson to modify his passage 14 to receive a heated liquid.

The sole reference in Wilson to using a heated liquid appears at column 6, line 60 through column 7, line 8 (reproduced below).

> The controlled labyrinth heat exchanging oil nozzle assembly **10** of the present invention may be secured within a tank, such as a hot water tank. The tank could be designed so that there was sealing around the exhaust tube, the burner flame portal and any other elements which must be kept separated from the water volume. Naturally, there would also be provided a cold water-in fitting and a hot water-out fitting mounted on the tank. Provision would be made for controlling the temperature of the water. The controlled labyrinth heat exchanging oil nozzle assembly **10** could be mounted in a vertical or a horizontal attitude within the tank. Water need only be made to flow over or surround the surfaces which define all of the heat exchange volumes of the heat exchanger or of the means used to transfer heat from hot exhaust gases to the water to be heated.

Wilson specifically proposes that a bath may be located to contact external surfaces of his entire nozzle assembly 10, including his electric heater element. The examiner's reliance on this passage at page 12 of the office action misconstrues and

applies the disclosure out of context and particularly ignores that Wilson when mentioning a water bath refers to mounting his entire oil nozzle assembly 10 in the bath, including his electric heater. The passage "that the water need only be made to flow over or surround the surfaces which define all of the heat exchanger volumes of the heat exchanger…" at most suggests the use of a redundant heated liquid to contact the exterior of Wilson's electrically heated assembly 10. **The passage does not support the examiner's asserted reconstruction of Wilson's electric heater passage 14 in view of Leach into Applicant's claimed assembly containing and internal, oil and heated liquid through passageways**.

Leach is cited for showing the use of a heated liquid to heat oil supply lines. By judicious selection of passages from Leach that are believed taken out of context and an assertion of an "analogous" standard, the examiner asserts it would be obvious from Leach to convert Wilson's electric heater passage 14 to a flow conduit used to conduct Leach's heated liquid through the reconstructed passage 14 in lieu of using Wilson's electric heater.

In contravention to this hindsight and unsupported reconstruction, Leach nowhere suggests any modification of his burner 100. Leach's only suggestion at col. 1, lines 43-47 (reproduced below)

Since it has been found that the proper combustion of heavy fuel oil depends upon the temperature of the oil, various types of systems have been proposed to heat such oil before being fired in a furnace. When the oil is cold, it becomes so thitck that it does not readily flow through the supply lines and in some cases actually blocks the passage of oil therethrough even under very high pressures. This makes it quite difficult to maintain a constant or proper flame in the furnace and increases wear on the mechanical parts of the system. Certain ones of the systems proposed for overcoming these difficulties have relied upon electrical or gas heater units disposed adjacent to adjacent to certain parts of the fuel oil supply line to heat the oil as it flows towards the burner, but these do not uniformly heat the oil so as to maintain the oil flowing to the burner at a substantially constant temperature so that uniform control of the flame cannot be maintained. Other systems have suggested heating the oil by various types of convection currents, but the convection medium must first be heated before it can be used to heat the fuel supply, thereby requiring additional time and supervision. In the aforementioned types of systems, since constantly changing ambient temperature conditions effect the viscosity in the oil in the supply line, each such change also requires a change in the controls of the heating system, thereby increasing costs and decreasing efficiency. An object of this invention, therefore, is to provide a fuel oil fired heating system that is simple in construction, efficient in operation, and which will overcome all of the aforementioned difficulties.

is to substitute a liquid manifold to replace electrical or gas heaters used to heat the exterior surfaces of bulk oil supply lines to heat oil as it flows toward a burner. Any adaptation/combination of Leach with Wilson therefore ignores Leach's teaching of only heating external surfaces of bulk oil supply lines (not internal oil supply passages in a burner head nor air passages in a burner head). The asserted obviousness of the combination to one skilled in the are also ignores that Wilson, Briggs and all of the earlier noted burner assemblies use electric heat sources at the burner head. It is therefore believed the examiner's interpretation of Leach col. 1, lines 43-47 over extends and/or misconstrues the teachings of Leach and particularly does not provide the motivation or suggestion interpreted by the examiner.

The use of a water bath at Wilson at most suggests immersing Wilson's burner assembly 10 in Leach's housing 12, but which still does not suggest deleting Wilson's

electric heater or modifying Wilson's passage 14 to serve as a liquid conduit, especially when considered in the proper context of Wilson's above disclosure at columns 6 and 7.

See also column 1, lines 60-63 which demonstrates intention to only heat bulk oil supply lines not a burner head assembly.

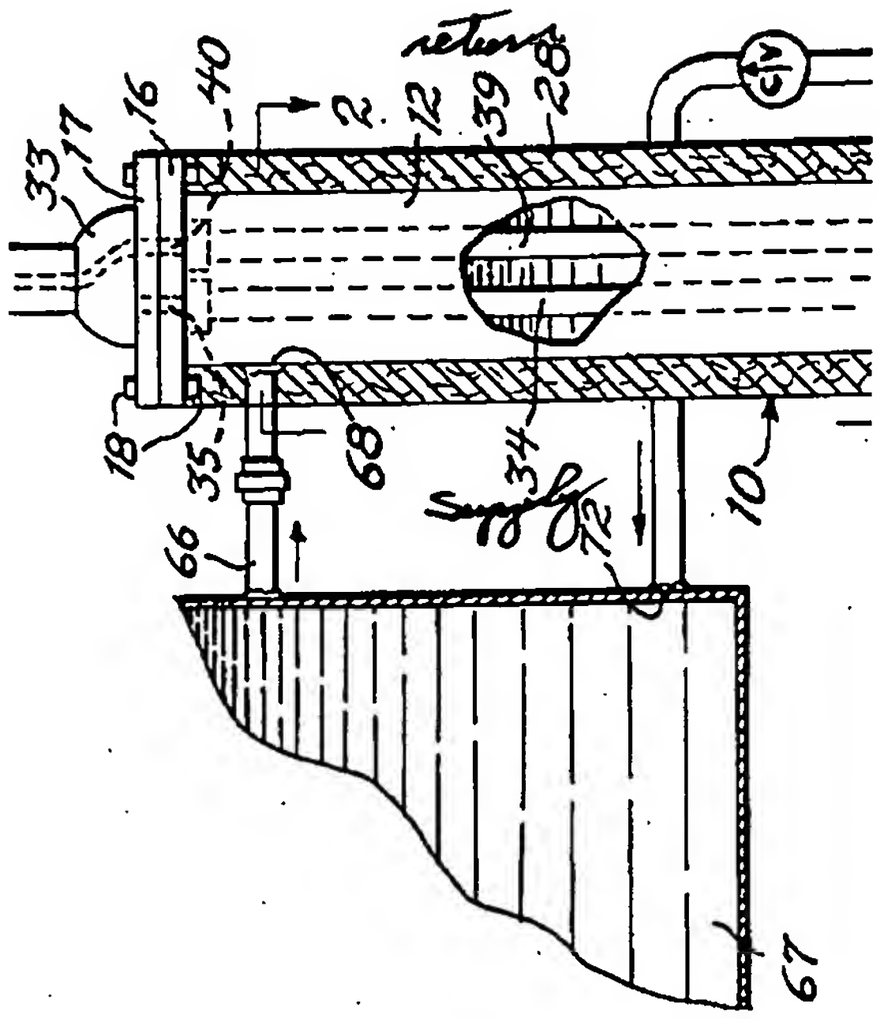
> Another object of this invention, is to provide a pre-heater system for fuel oil lines wherein the fuel oil supply lines are heated along with the fuel oil return lines.

Additionally and in further regard to multiple comments by the examiner asserting that Leach teaches the heating of an air passageway, column 2, lines 25-72 and a portion of Figure 1 of Leach are provided below that demonstrate the examiner's misunderstanding and/or misapplication of Leach.

The upper vertical stem of the reducer coupling communicates with a fuel line **31** that is adapted to be supplied with fuel oil from a fuel oil tank **32**. A fuel oil delivery line **34** is in communication with the interior of the reducer coupling by means of a port **35** that extends through the connected flanges **16, 17**. A tank return feed line **38** of substantially reduced cross-sectional area than the fuel line **31**, is received within the vertical stem **30** of the reducer coupling and communicates with the tank return line **39** disposed within the vertical section **12** of the preheater by means of a port **40** extending through the abutted flanges **16, 17**. Except for the ports **35, 40**, the flanges **16, 17**, effectively seal the upper extremity of the vertical section **12**.

The delivery line **34** extends downwardly through the interior of the vertical section **12**, and into the elbow and horizontal sections of the preheater assembly, from which it extends outwardly through a port or other suitable outlet **43** into a connecting line **44** having a manually-operated shutoff valve **45** associated therewith. The delivery line then communicates with the inlet side **46** of a screen type strainer assembly **47** that is disposed within a heater jacket **49** which has an opening **50** in abutting engagement with the outer extremity of the horizontal preheater section **13**. The outlet **51** of the strainer communicates with an outlet line **52** that has a thermometer **53** and positive drive fuel pump **54** associated therewith and terminating with its engagement with one side of a three-way fitting **56**. One side of the fitting **56** is provided with an inlet line **57** which communciates with the burner **100** of the furnace assembly **101**. This line **57** includes a dial-type pressure gauge **58** and a magnetic relay valve **59** that is effective to automatically discontinue the supply of fuel to the burner. The third connection to the fitting **56** is provided with a return line **61** which includes a manually adjustable pressure control valve **62** and which is received within the horizontal section **13** through a fluid-tight port **63** and communicates directly with the tank return line **39** that extends upwardly through the entire preheater assembly and into the interior of the reducer coupling where it is directly connected to the tank feed line **38**.

A hot water delivery line **66** is in communication with the hot water boiler tank **67** of the system and is adapted to deliver water therefrom into the interior of the interconnected vertical, elbow, and strainer jacket sections by means of an inlet port **68**. An outlet connecting line **69** communicating with the lower extremity of the strainer jacket **49** connects with the inlet side of a motor-driven



For example, the examiner states at page 9, lines 16 and 17 of the office action that "Leach discloses an oil heating device in the same field of endeavor as Wilson and includes passageways that receive oil, **air**, and a heated liquid (water)". At page 10, line 9-13 states, "the examiner considers that the preheating assembly (10) is analogous to the manifold of Wilson in that it includes a housing (12) with an interior **air** passageway, oil passageway, and a heating passageway that receives a heated liquid in order to heat both the oil and air passageways (see Leach, at least col. 2, lines 28-70)".

Upon reference to the above teachings of Leach, it is however clear the examiner is mistaken. **Nowhere does Leach teach the heating of any air passageway whether or not coupled to a burner, since nowhere does Leach teach or describe the construction of his burner 100 nor discuss any air supply in his system. Leach only immerses his bulk oil supply and return lines 34 and 39 in his housing 12, and neither of which is an air line**. Accordingly, Leach does not support any assertion of

teaching Applicant's claimed burn head manifold having through passageways that receive oil, heated liquids and air.

Even though the examiner believes Leach to be **analogous** to Wilson (section 15, page 11, line 9 of the office action), the art must be taken for what is actually taught or directly suggested. Applicant is not aware of any TTAB findings or caselaw that supports any standard for re-constructing or combining cited art on the basis of being functionally analogous. References may be functionally equivalent and thereby relevant art, but structural distinctions must still be considered in the context presented and cannot be adapted without some motivation or suggestion found in the art made by one skilled in the art, not hindsight musings.

The proposed reconstruction of Wilson in view of Leach is also negated when considered in view of the comments of the affiants (e.g. Mr. Wiersgalla, ¶9, 10, and 12; Mr. Tim Kuhn, ¶10-13; and Mr. Dunn, ¶9, 10, and 13), **who represent persons actually skilled in the art, each having 20+ years of experience in the art, and who do not believe the asserted combination of Wilson with Leach is obvious**. The examiner's cursory reference to affiant comments regarding size, safety and maintenance does not avoid or negate the relevance of these affidavits, especially in the face of no contravening disclosures from the art and especially in the face of the prior burner art all showing and using electric heaters at the burner head.

Moreover the claims have been amended to distinguish the input and output ports at applicant's second passageway that promote the flow of applicant's heated liquid through the second passageway and manifold. Wilson only provides for an input port to receive his electric heater.

Briggs teaches a manifold assembly that is heated with an electric heater 76. A single, reduced diameter air passage 142 couples to a downstream nozzle cavity 132. In contrast, Applicant couples multiple narrowed passages 41 to a second nozzle cavity 42 located upstream of a first nozzle cavity 26, Figs. 3-6.

In short, nothing in the cited references alone or in combination discloses or suggests providing heated liquid passageway(s) within a machined, solid body burner head manifold assembly supporting a nozzle to heat fuel oil directed through the manifold to a combustible temperature at discharge of the oil from the nozzle and combustion. Nor do the cited references alone or in combination teach or obviate Applicant's method of heating the fuel with a liquid close to the combustion point of the fuel at the burner head, immediately prior to combustion. Nor do the cited references alone or in combination teach the concurrent heating of atomizing air in the burner head manifold with a heated liquid source and especially not within a manifold having multi-segmented air passageways, nozzle receiving cavities etc. as organized and arranged and as claimed by applicant.

The foregoing distinctions are particularly provided for at the amended apparatus and method claims. The claims have been amended to particularly distinguish the following: 1) the through flow construction of Applicant's burner assembly at the first (oil), second (heated liquid) and third (air) passageways; 2) the elevating of the oil temperature to a combustible temperature, not merely to promote oil flow; 3) the coupling of the third (air) passageway to the second, upstream nozzle cavity; 4) the configuration of the third (air) passageway to provide a first and a plurality of second branching sections that exhibit smaller longitudinal cross sections from the first.

With the foregoing amendments to the claims and distinguishing remarks, the application is believed distinguishable and patentable over the art and in a condition for allowance and/or appeal should that be necessary. No new matter has been entered with any of the foregoing amendments. Applicant requests the examiner's reconsideration of the application and an early notice to the allowance thereof.

If any matters remain that can be handled with a telephone conference, the examiner is encouraged to contact the undersigned.

Respectfully submitted,

Douglas L. Tschida
Registration No. 28481
Customer No. 27390
633 Larpenteur Ave. West, Ste. B
St. Paul, Minnesota 55113
(651) 488-8285
fax (651) 488-8305
email dltschida@aol.com

Enclosures